



US009345152B2

(12) **United States Patent**  
**Chang**

(10) **Patent No.:** **US 9,345,152 B2**  
(45) **Date of Patent:** **May 17, 2016**

(54) **FOAM ASSEMBLY AND METHOD FOR MANUFACTURING THE SAME, AND ELECTRONIC DEVICE USING THE FOAM ASSEMBLY**

(71) Applicant: **FIH (Hong Kong) Limited**, Kowloon (HK)

(72) Inventor: **Chih-Wei Chang**, New Taipei (TW)

(73) Assignee: **FIH (Hong Kong) Limited**, Kowloon (HK)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 570 days.

(21) Appl. No.: **13/726,876**

(22) Filed: **Dec. 26, 2012**

(65) **Prior Publication Data**

US 2014/0055921 A1 Feb. 27, 2014

(30) **Foreign Application Priority Data**

Aug. 27, 2012 (CN) ..... 2012 1 0307024

(51) **Int. Cl.**  
**B05D 5/10** (2006.01)  
**H05K 5/02** (2006.01)  
**B05D 1/28** (2006.01)

(52) **U.S. Cl.**  
CPC ..... **H05K 5/0217** (2013.01); **B05D 1/28** (2013.01); **Y10T 428/24347** (2015.01)

(58) **Field of Classification Search**  
CPC ..... B05D 1/28; Y10T 428/24347  
USPC ..... 427/207.1, 208; 428/140  
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2003/0143338 A1\* 7/2003 Neuhaus-Steinmetz B05C 1/0813

427/551

\* cited by examiner

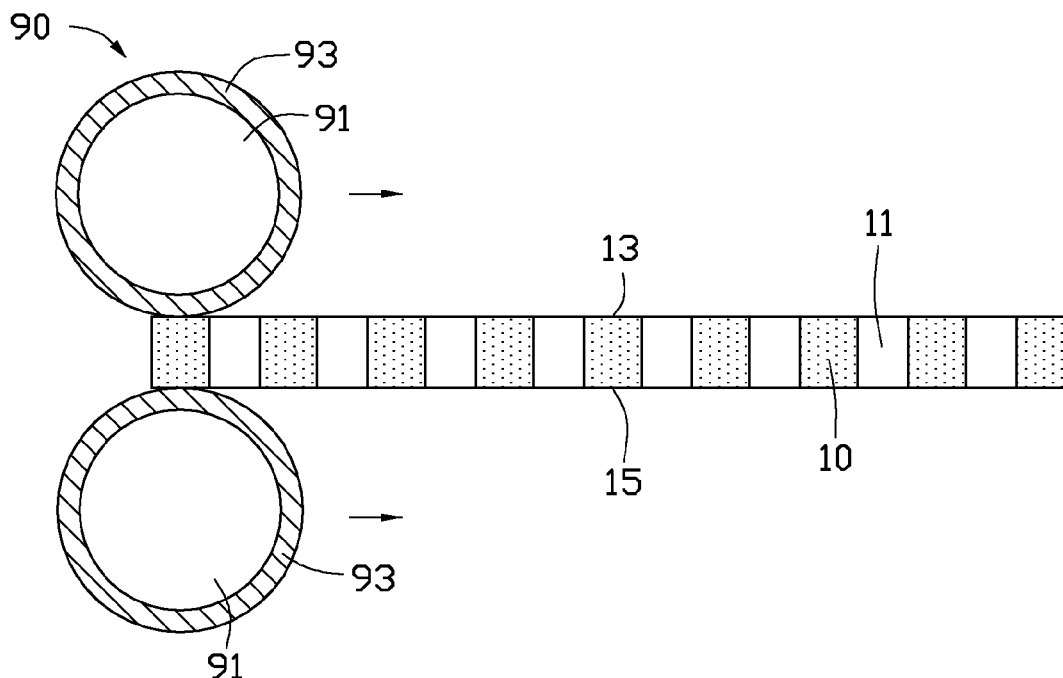
*Primary Examiner* — Xiao Zhao

(74) *Attorney, Agent, or Firm* — Novak Druce Connolly Bove + Quigg LLP

(57) **ABSTRACT**

A foam assembly includes a foam body, the foam body defining a plurality of through holes. The foam assembly further includes a colloid body formed by a first colloid portion formed on one of two opposing surfaces of the foam body, a second colloid portion formed on a second of two opposing surfaces of the foam body, and connecting portions extending through the through holes of the foam body from one opposing surface of the foam body to the other. A method for manufacturing the foam assembly and an electronic device using the foam assembly are also disclosed.

**2 Claims, 4 Drawing Sheets**



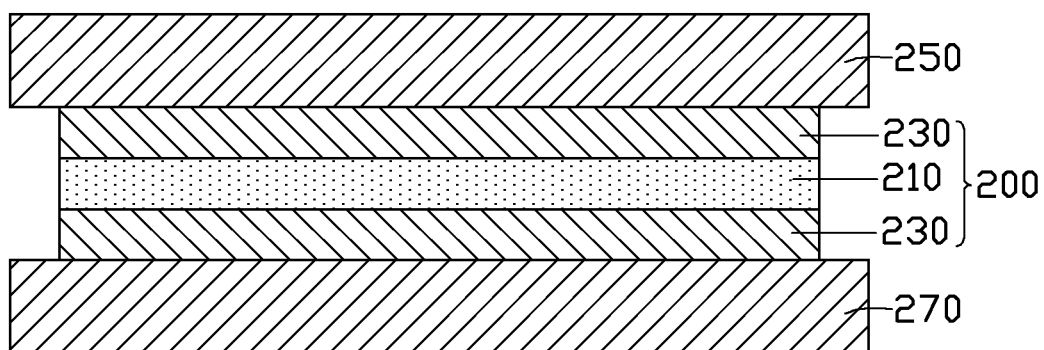


FIG. 1  
(PRIOR ART)

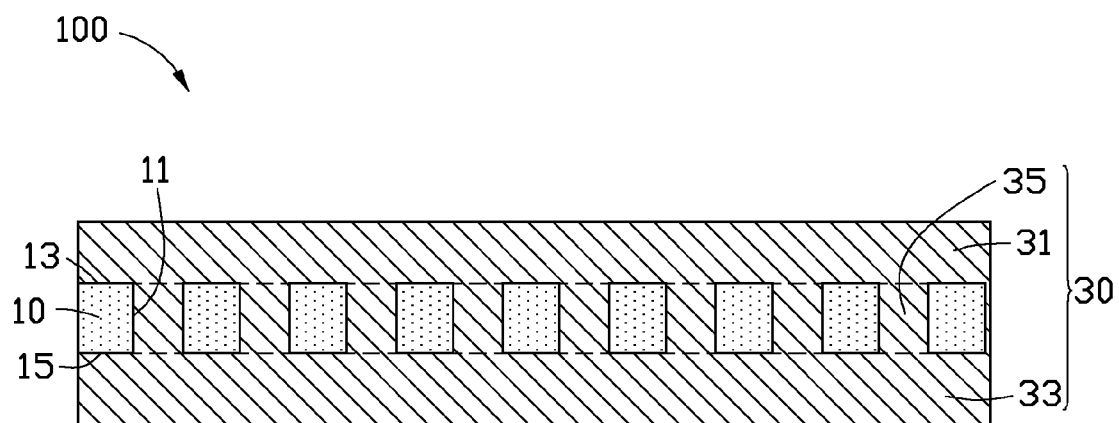


FIG. 2

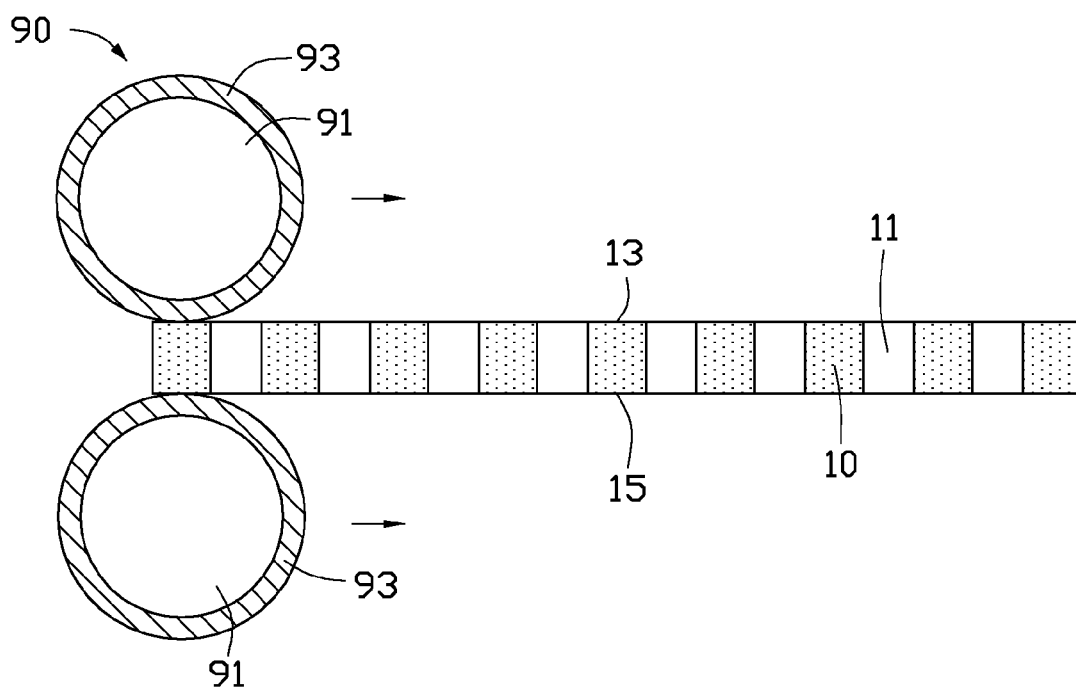


FIG. 3

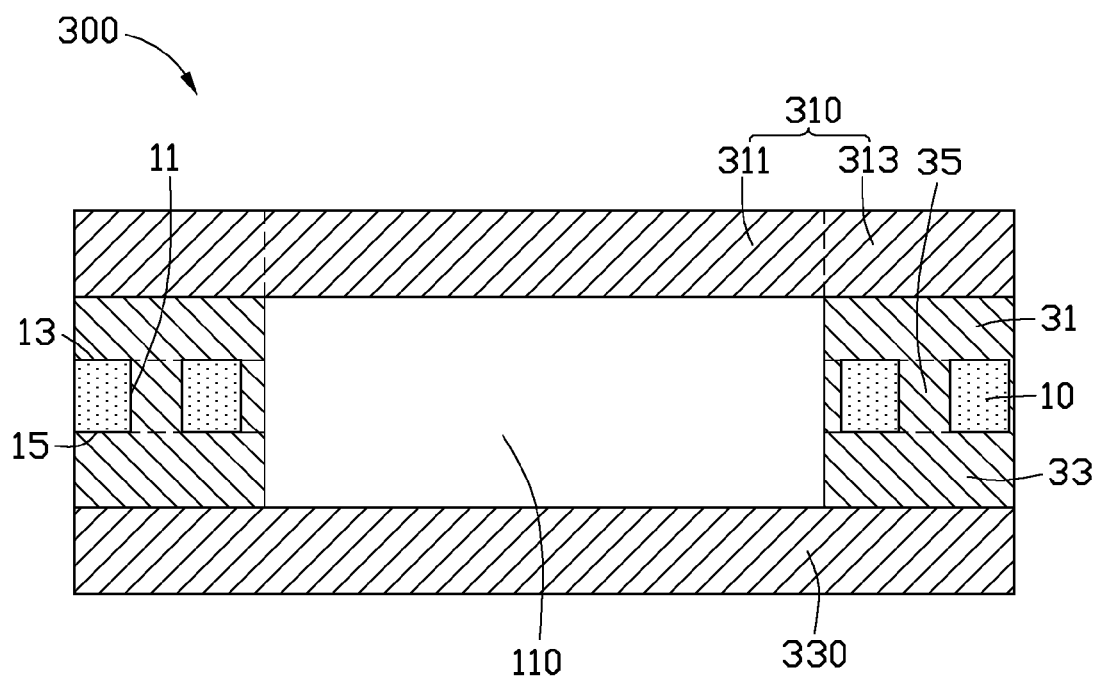


FIG. 4

1

# FOAM ASSEMBLY AND METHOD FOR MANUFACTURING THE SAME, AND ELECTRONIC DEVICE USING THE FOAM ASSEMBLY

## BACKGROUND

### 1. Technical Field

The present disclosure relates to a foam assembly and a method for manufacturing the foam assembly, and electronic device using the foam assembly.

### 2. Description of Related Art

A foam **200** of prior art in FIG. **1** is used as a buffering and shockproof element for a window of electronic device. The foam **200** includes a foam body **210**, and adhesive tapes **230** formed on opposing surface of the foam body **210**. The two adhesive tapes **230** adhere respectively to a window body **250** and a cover **270**. Since the foam **200** is commonly a soft material with a very fragile structure, when the foam **200** needs to be detached from the electronic device, the foam **200** is damaged very easily and pieces, which are hard to remove from the window body **250** or the cover **270**, break off, making it very difficult to use the body **270** again. Additionally, the two adhesive tapes **230** are prone to shifting or sliding out of position when the foam body **210** is cut to form a desired structure, which negatively affects the cutting accuracy. Furthermore, the foam body **210** having low rigidity is easily deformed.

Therefore, there is room for improvement within the art.

## BRIEF DESCRIPTION OF THE DRAWINGS

Many aspects of the embodiments can be better understood with reference to the following drawings. The components in the drawings are not necessarily drawn to scale, the emphasis instead being placed upon clearly illustrating the principles of the exemplary foam assembly and method for manufacturing the foam assembly. Moreover, in the drawings, like reference numerals designate corresponding parts throughout the several views. Wherever possible, the same reference numbers are used throughout the drawings to refer to the same or like elements of an embodiment.

FIG. **1** is a cross-sectional view of a foam of prior art.

FIG. **2** is a cross-sectional view of an embodiment of a foam assembly.

FIG. **3** is a schematic view of an embodiment of a roller used to make the foam assembly in FIG. **2**.

FIG. **4** is a cross-sectional view of an embodiment of an electronic device housing with the foam assembly in place.

## DETAILED DESCRIPTION

FIG. **2** shows a foam assembly **100** according to an exemplary embodiment. The foam assembly **100** includes a foam body **10**. The foam body **10** defines a plurality of through holes **11**. The foam body **10** includes a first surface **13** and an opposing second surface **15**. The foam body **10** further includes a colloid body **30** integrally formed as a first colloid layer **31**, a second colloid layer **33**, and a plurality of connecting bodies **35**. The first colloid layer **31** is formed on one surface of the foam body **10**. The second colloid layer **33** is formed on the other surface of the foam body **10**. The connecting bodies **35** extend through the through holes **11** of the foam body **10** to interconnect the first and second colloid layers (**31**, **33**).

The foam body **10** has a thickness of about 0.1 mm to about 2 mm.

2

The through holes **11** may be circular, triangular, square in shape or other geometric shape. In the embodiment, the through holes **11** are uniformly defined and arranged in the foam body **10**.

As previously mentioned, the colloid body **30** includes a first colloid layer **31**, a second colloid layer **33** and a plurality of connecting bodies **35**. The first colloid layer **31** is formed on the first surface **13**. The second colloid layer **33** is formed on the second surface **15**. The connecting bodies **35** extend through the through holes **11**, and integrally connect the first colloid layer **31** and the second colloid layer **33**. In the embodiment, the connecting bodies **35** are uniformly arranged in the foam body **10** to improve the rigidity of the foam body **10**. The first colloid layer **31** and the second colloid layer **33** may be made of the same material or different materials.

A method for manufacturing the foam assembly **100** may include at least the following steps:

A foam body **10** is provided. The foam body **10** defines a plurality of through holes **11**. The through holes **11** are formed by cutting the foam body **10** using a hob. In the embodiment, the through holes **11** are uniformly dispersed in the foam body **10**.

Referring to FIG. **3**, a colloid coating device **90** is provided. The device **90** includes two opposing rollers **91**. The outer surface of each roller **91** is covered with a glue **93** or glues **93** to form the first colloid layer **31** and the second colloid layer **33** on the foam body **10**. The glue **93** on each roller **91** may be made of the same material or different materials.

The foam body **10** is positioned between the two rollers **91** and the coating device **90** is turned on. The rollers **91** are moved from one end of the foam body **10** towards to the opposing end of the foam body **10**, as indicated by the arrow in FIG. **3**. The glue **93** on each roller **91** is coated onto the first surface **13** and the second surface **15**. Simultaneously, some of the glue **93** flows into and fills the through holes **11**.

The glue **93** solidifies on and in the foam body **10** to form the colloid body **30**.

Then, the foam body **10** is cut to form a desired structure of the foam assembly **100**.

Referring to FIG. **4**, an electronic device **300** using the foam assembly **100** includes a window assembly **310**, a housing **330**, and a foam assembly **100** mounted between the window assembly **310** and the housing **330**.

The foam assembly **100** defines an opening **110**. The window assembly **310** includes a window portion **311** and a window border **313**. The opening **110** corresponds to the window portion **311**. The window border **313** corresponds to the foam assembly **100** and directly covers the foam assembly **100**.

According to the disclosure, the first colloid layer **31** and the second colloid layer **33** are connected by the connecting body **35**, which acts to maintain the foam assembly **100** in one piece, and reduce damage, when the foam assembly **100** is completely removed from the electronic device **300**, thus improving the recycling rate of the window assembly **310** and the housing **330**. The connecting bodies **35** improve the rigidity of the foam body **10** and decrease the thickness of the foam assembly **100**, and avoid any problems with shifting or sliding of the adhesive element when the foam assembly **100** is cut to form a desired structure. The handleability of the foam assembly **100** is improved.

It is to be understood, however, that even through numerous characteristics and advantages of the exemplary disclosure have been set forth in the foregoing description, together with details of the system and function of the disclosure, the disclosure is illustrative only, and changes may be made in

detail, especially in the matters of shape, size, and arrangement of parts within the principles of the disclosure to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

What is claimed is:

5

1. A method for manufacturing a foam assembly comprising:

providing a foam body, the foam body defining a plurality of through holes;

providing a colloid coating device, the device comprising 10  
two opposing rollers, outer surface of the rollers being covered with glue;

positioning the foam body between the two rollers;

causing the rollers to move from one end of the foam body 15  
towards to the opposing end of the foam body so that the glue is coated onto two opposing surfaces of the foam body, some of the glue flowing into and filling in the through holes;

solidifying the glue to form a colloid body on and in the 20  
foam body, the colloid body having portions formed on the two opposing surfaces of the foam body and extending through the through holes from one opposing surface of the foam body to the other.

2. The method as claimed in claim 1, wherein the through 25  
holes are formed by cutting the foam body using a hob.

\* \* \* \* \*